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(54) A LEATHER WASHING MACHINE

(71) We, IRISH LEATHERS LIMITED, a Company organised under the laws of the Republic of Ireland, of 4 Lapps Quay, Cork, County Cork, Ireland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The present invention relates to tanning and in particular to the washing of hides and skins of animals, hereinafter referred to as leather.

During tanning the surface of the leather has to be washed. For example, a pasting paste is used on the surface of leather for the purpose of holding the leather in position on vertically arranged glass sheets while the leather is being smoothed out and stretched for drying. The paste has subsequently to be washed off. Further, the surface of the leather has often to be washed in preparation for the subsequent finishing processes.

25 The machines currently used for such washing operations are basically bristle type brushes operating a wet brushing action on the leather. For example, when these bristle type brushes are used to wash pasting paste off leather, they have the effect more of distributing the adhering paste rather than removing it from the leather. The known method of washing has the additional disadvantage of excessively wetting the leather, which requires subsequent drying. Further the action of the bristles tends to roughen the surface of the leather.

The present invention is directed towards providing a more efficient apparatus for washing leather.

According to the invention there is provided:

apparatus for washing leather including a rotatable shaft having a plurality of flails mounted thereon for beating the leather,

means for moving the leather relative to the flails and means for delivering a washing liquid onto the leather as it is beaten by the flails.

The invention will be more clearly understood from the following description of some preferred embodiments thereof given by way of example only with reference to the accompanying drawings in which:—

Fig. 1 is a side, partially diagrammatic view, of an apparatus according to the invention;

Fig. 2 is a plan view of one construction of flail according to the invention,

Fig. 3 is a side view of the flail of Fig. 2,

Fig. 4 is a cross-sectional view in the direction of the arrows IV-IV of Fig. 2,

Fig. 5 is a plan view of an alternative construction of flail according to the invention,

Fig. 6 is a side view of the flail of Fig. 5,

Fig. 7 is a cross-sectional view in the direction of the arrows VII-VII,

Fig. 8 is a view similar to Fig. 1 of the conversion of a conventional tannery machine to a leather washing machine, according to the invention.

Referring to the drawings and initially to Fig. 1 to 4 thereof, there is provided a leather washing apparatus or machine indicated generally by the reference numeral 1. The machine 1 is provided with a support framework 2 on which is mounted a base 3 incorporating a drain-off pipe 4. The machine 1 is provided with a cover 5 incorporating drain-off gutters 6. A spray pipe 7 is mounted within the machine 1 above and between a pair of rotatable shafts 8 carrying flexible flails 9. The shafts 8 are height adjustable by means not shown. A conveyor 10 formed from a drive pulley 11, tail drum 12, intermediate roller 13 and a belt 14 is mounted on the support frame

2. A pair of gripping rollers 15 are provided. Each gripping roller 15 co-operates with an intermediate roller 13. The rollers 13 and 15 are arranged to run at the same speed. The shafts 8 are driven by motors and associated drive gears, not shown. The shafts 8 are arranged for contra-rotation.

Above the conveyor 10 adjacent the machine 1 is mounted a further spray pipe 16.

Referring to Figs. 2, 3 and 4 there is illustrated the flexible flails 9. It will be noted that each flexible flail 9 is of semi-circular cross-section and is provided on its lower contact surface, indicated generally by the reference numeral 17, with a number of upstanding ribs 18. The ribs 18 are substantially parallel to the rotational axis of each shaft 8.

In use, leather, identified by the reference numeral 19 is placed on the conveyor 10 and progresses in the direction of the arrow A. The leather is initially wetted by the spray pipe 16 and the leather is then gripped between the first set of gripping rollers 15 and the intermediate roller 13. The leather is then delivered into the machine 1. The wet leather 19 comes in contact with the flails 9 which have a combined scuffing and squeegeeing effect. It will be appreciated that the spray pipe 7 ensures that a fine mist of water is maintained within the machine 1. The heat caused by the action of the flails 9 on the leather 19 maintains the leather 19 in a drier state than has heretofore been possible with conventional tannery equipment and hence the need for subsequent drying is reduced or eliminated. The leather 19 is delivered out of the machine 1 on the conveyor 10.

It has been found that the flails should come into contact with the leather over about 25% to 50% of their length. This can be readily arranged by altering the spacing of the shafts 8 from the surface of the leather.

Referring to Figs. 5, 6 and 7 there is illustrated an alternative construction of flail identified by the reference numeral 20. The flail 20 is of substantially rectangular cross-section and is again provided with upstanding ribs 21 on its lower contact surface.

Referring to Figs. 8, there is illustrated a conventional tannery machine, indicated generally by the reference numeral 30 having a cover 31, base 32 and associated drain-off gutter 33 and drain-off pipe 34. The main shaft of the machine has been removed and replaced by a rotatable shaft 35 having flexible flails 36, an upper gripping roller 37 is provided as is a lower gripping roller 38 and associated auxiliary roller 39. Mounted adjacent the lower gripping roller 38 is a curved support plate 40. The lower gripping roller 38, auxiliary roller 39 and sup-

port plate 40 are mounted on a conventional pivotal support (not shown) which enables the lower gripping roller 38, auxiliary roller 39 and support plate 40, to be moved as an assembly from the position illustrated by the interrupted lines to the position illustrated by the full lines. The auxiliary roller 39 merely acts as a support for the lower gripping roller 38. Means (not shown) are provided for driving the upper gripping roller 37. A spray pipe 41 and the necessary control gear is provided.

In operation, the lower gripping roller 38, auxiliary roller 39 and support plate 40 are pivoted downwards into the position illustrated by the interrupted lines and the leather is placed within the machine 1 in the direction of the arrow B, the operator retaining sufficient of the leather in his or her hands so that it may be placed over the lower gripping roller 38.

The lower gripping roller 38, auxiliary roller 39 and support plate 40 are then pivoted upwards to make contact with the rotating flail 36. When the upper gripping roller 37 contacts the lower gripping roller 38 the operator causes the upper gripping roller 37 to rotate and the leather is then removed from the machine in the direction of the arrow C.

The gripping rollers in either of the embodiments above may be of any suitable material and are preferably covered with or formed from a resilient material and may be serrated with deep cut teeth. In this way it is possible to avoid folds and wrinkles being impressed into the leather. Alternatively, incorporation of a setting-out cylinder may be necessary to achieve the same results.

The flails may be manufactured of any suitable material such as rubber or any flexible plastics material. The flails may be of any suitable shape for example square, rectangular or semi-circular section, but preferably the washing surface has a serrated pattern. For example, the ribs, as illustrated in Figs. 2 to 7 may be at right angles to the axis of rotation of the shaft.

The speed or rotation of the flails in one embodiment according to the invention may vary between the range of 100 to 200 rpm. The length of flails to obtain sufficient tip speed is between 12" and 15". Accordingly, to obtain the contact necessary the spacing between the exterior of the shaft 7 and the top of the leather is of the order of 8" to 11".

It will be appreciated that each shaft may be operated by activation of a pressure switch and/or a photo-electric eye so that it operates only when the appropriate rollers are holding or gripping leather.

While in the second embodiment described above the invention has been formed by

replacing the working cylinder of a tannery machine it will also be appreciated that the apparatus according to the present invention could be fitted to many other types of machine.

WHAT WE CLAIM IS:—

1. Apparatus for washing leather including a rotatable shaft having a plurality of flails mounted thereon for beating the leather, means for moving the leather relative to the flails and means for delivering a washing liquid onto the leather as it is beaten by the flails.

2. Apparatus as claimed in claim 1 in which the surface of the flail which contacts the leather is serrated.

3. Apparatus as claimed in Claim 2 in which the serrated surface is formed from a series of parallel upstanding ribs.

4. Apparatus as claimed in Claim 3 in which the ribs are at right angles to the shaft axis.

5. Apparatus as claimed in Claim 3 in which the ribs are parallel to the shaft axis.

6. Apparatus as claimed in any preceding Claim in which the flails are manufactured of a flexible and resilient material.

7. Apparatus as claimed in Claim 6 in which the material is rubber.

8. Apparatus as claimed in Claim 6 in which the material is a plastics material.

9. Apparatus as claimed in any preceding Claim in which there are provided two parallel shafts, said shafts being drivable in opposite directions.

10. Apparatus as claimed in any preceding Claim in which the means for moving the leather comprises a plurality of pairs of gripping rollers.

11. Apparatus as claimed in any preceding Claim in which the distance between the shaft and the leather is variable.

12. Apparatus for washing leather substantially as described herein with reference to and as illustrated in Figs. 1 to 4 of the accompanying drawings.

13. Apparatus for washing leather substantially as described herein with reference to and as illustrated in Figs. 1 and 5 to 7 of the accompanying drawings.

14. Apparatus substantially as described herein with reference to and as illustrated in Figs. 8 and 2 to 4 of the accompanying drawings.

15. Apparatus for washing leather substantially as described herein with reference to and as illustrated in Figs. 8 and Figs. 5 to 7 of the accompanying drawings.

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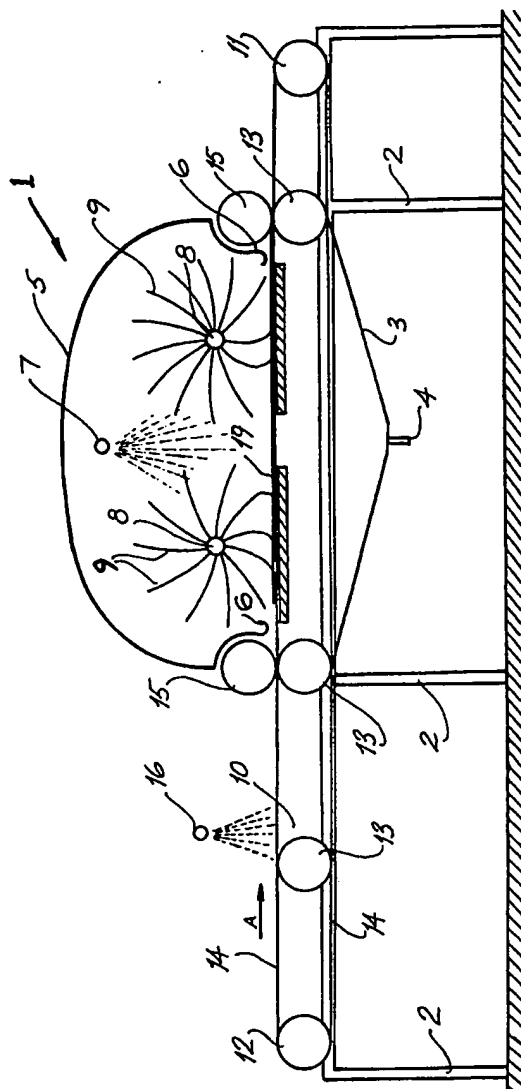


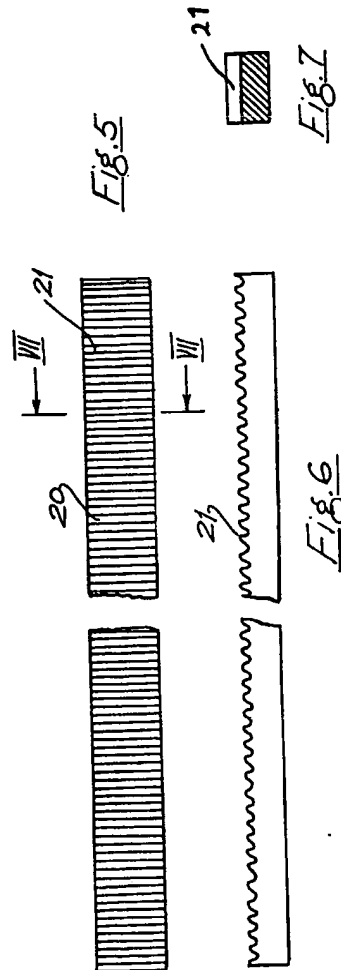
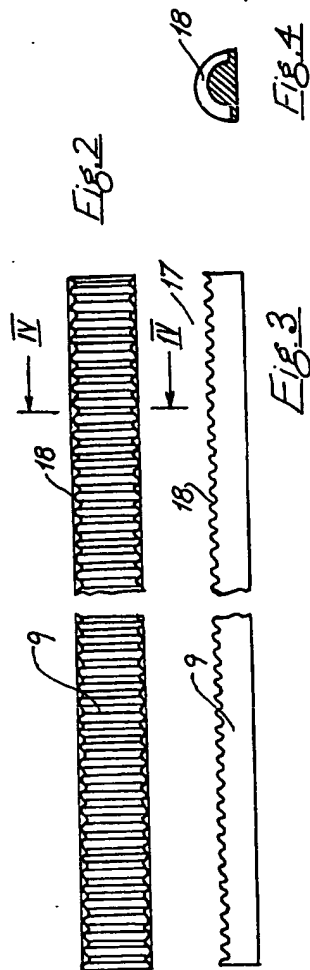
Fig. 1

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COMPLETE SPECIFICATION

3 SHEETS

This drawing is a reproduction of
the Original on a reduced scale
Sheet 2



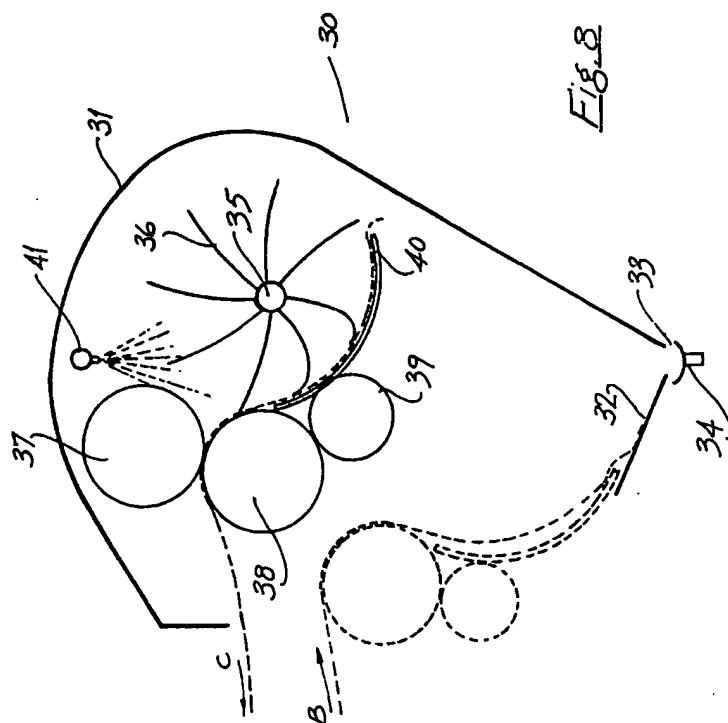


Fig. 8

flail of
rubber or
flexible
plastic